What is claimed is:

1. A pipeline processing type shaping apparatus that calculates a predetermined scheduling time by performing pipeline processing by a pipeline processing portion concerning an input packet of a plurality of flows and shaping each of these flows, including:

a storage part that manages and stores flow information being processed in the pipeline processing portion for each of the flows; and

a calculating part that calculates the predetermined scheduling time, referring to the flow information regarding the flow of a packet input to the pipeline processing portion, and assuming that a virtual packet was input in which all packets that belong to the flow are connected.

2. The pipeline processing type shaping apparatus according to claim 1, wherein the calculating part includes a reading part for reading the flow information of a flow to which this packet belongs from the storage part in response to the input of a packet to the pipeline processing portion and a means for calculating the predetermined scheduling time referring to this read information.

3. The pipeline processing type shaping apparatus according to claim 2, further including a storage information update part that updates the flow information of the storage part for each of the flows in response to the input of the packet to the pipeline processing portion.

4. The pipeline processing type shaping apparatus according to claim 3, wherein the storage part has internal

3 registers that are equal to the number of processing blocks of
4 the pipeline processing portion, and each of the internal
5 registers stores the flow information of a packet that belongs
6 to the same flow for which pipeline processing is being processed.

1 5. The pipeline processing type shaping apparatus
2 according to claim 4, wherein the flow information includes the
3 sum total of the packet length.

1 6. A pipeline processing type shaping method that
2 performs the pipeline processing by a pipeline processing portion
3 concerning an input packet for a plurality of flows, shapes each
4 of these flows, and calculates a predetermined scheduling time,
5 including the steps of:

6 managing and storing flow information being processed in
7 the pipeline processing portion for each of the flows; and

8 calculating the predetermined scheduling time, referring
9 to the flow information regarding the flow of the packet input
10 to the pipeline processing portion, and assuming that a virtual
11 packet was input in which all packets that belong to the flow
12 are connected.

1 7. The pipeline processing type shaping method according
2 to claim 6, wherein the calculating step includes the steps of
3 reading the flow information of a flow to which this packet belongs
4 from a storage part in response to the input of a packet to the
5 pipeline processing portion and calculating the predetermined
6 scheduling time referring to this read information.

1 8. The pipeline processing type shaping method according
2 to claim 7, further including the step of updating flow
3 information of the storage part for each of the flows in response

4 to input of the packet to the pipeline processing portion.

1   9. The pipeline processing type shaping method according
2 to claim 8, wherein the storage part has internal registers that
3 are equal to the number of processing blocks of the pipeline
4 processing portion and wherein each of the internal registers
5 stores the flow information of a packet belonging to the same
6 flow for which pipeline processing is being processed.

1   10. The pipeline processing type shaping method
2 according to claim 9, wherein the flow information includes the
3 sum total of the packet length.

1   11. A recording medium that records a control program
2 of a pipeline processing type shaping method in which a
3 predetermined scheduling time is calculated by performing the
4 pipeline processing by a pipeline processing portion concerning
5 an input packet for a plurality of flows and shaping each of
6 these flows, and the control program, including the steps of:

7   managing and storing flow information being processed in
8 the pipeline processing portion for each of the flows; and

9   calculating the predetermined scheduling time, referring
10 to the flow information regarding the flow of the packet input
11 to the pipeline processing portion, and assuming that a virtual
12 packet was input in which all packets that belong to the flow
13 are connected.

1   12. The recording medium according to claim 11, further
2 including the steps of reading the flow information of a flow
3 to which this packet belongs from the storage part and calculating
4 the predetermined scheduling time referring to this read
5 information, in response to the input of the packet to the pipeline

6 processing portion,

1   13. The recording medium according to claim 12, further
2 including the step of updating flow information of the storage
3 part for every flow in response to the input of the packet to
4 the pipeline processing portion.

1   14. The recording medium according to claim 13, wherein
2 the storage part has internal registers that are equal to the
3 number of processing blocks of the pipeline processing portion
4 and wherein each of the internal registers stores the flow
5 information of a packet belonging to the same flow for which
6 pipeline processing is being processed.

1   15. The recording medium according to claim 14, wherein
2 the flow information includes the sum total of the packet length.

1   16. A pipeline processing type shaping apparatus,
2 including:

3   a unit for performing pipeline processing concerning an
4 input packet of a plurality of flows; and

5   a unit for calculating a predetermined scheduling time
6 by shaping each of these flows assuming that a virtual packet
7 was input in which packets that belong to the flow are connected.

1   17. A pipeline processing type shaping apparatus that
2 calculates a predetermined scheduling time by performing
3 pipeline processing by a pipeline processing portion concerning
4 an input packet of a plurality of flows and shaping each of these
5 flows, including:

6   a storage means that manages and stores flow information
7 being processed in the pipeline processing portion for each of
8 the flows; and

9   a calculating means that calculates the predetermined
10   scheduling time, referring to the flow information regarding
11   the flow of a packet input to the pipeline processing portion,
12   and assuming that a virtual packet was input in which all packets
13   that belong to the flow are connected.

1   18. The pipeline processing type shaping apparatus
2   according to claim 17, wherein the calculating means includes
3   a means for reading the flow information of a flow to which this
4   packet belongs from the storage means in response to the input
5   of a packet to the pipeline processing portion and a means for
6   calculating the predetermined scheduling time referring to this
7   read information.